CLAIMS

1. A recombinant cell expressing on its surface a multifunctional adhesin protein derived from a naturally occurring adhesin protein, the multifunctional adhesin protein containing at least one first kind of binding domain and at least one second kind of binding domain, said first kind of binding domain is capable of binding to an organic receptor and said second kind of binding domain is one that is not naturally present in the adhesin protein from which the multifunctional adhesin protein is derived and is capable of binding to a compound to which the naturally occurring adhesin protein substantially does not bind.

2. A cell according to claim 2 where the adhesin protein is part of a cell surface fibril selected from the group consisting of fimbriae or pili.

3. A cell according to claim 2 where the adhesin protein is derived from FimH.

4. A cell according to claim 3 where the first kind of binding domain is a naturally occurring binding domain.

5. A cell according to claim 3 where the first kind of binding domain has an amino acid sequence which differs from the *E. coli* PC31 FimH adhesin as defined herein in at least one amino acid whereby its saccharide binding characteristics is changed relative to those of the *E. coli* PC31 FimH adhesin.

6. A cell according to claim 3 where the second kind of binding domain is provided in the adhesin protein by inserting into the gene coding for said adhesin a DNA sequence coding for a peptide sequence conferring the capability of binding to a compound to which the naturally occurring adhesin protein substantially does not bind, whereby the adhesin is expressed as a chimeric protein comprising said first and second kind of binding domains.

7. A cell according to claim 6 wherein the inserted DNA sequence codes for a metal binding peptide sequence

8. A cell according to claim 6 where the inserted DNA sequence codes for a peptide sequence comprising a number of amino acids which is in the range of 2 to 100.

9. A cell according to claim 8 wherein the peptide sequence comprises at least one histidine residue.

10. A cell according to claim 7 where the second kind of binding domain confers to the cell the capability of binding a metal compound selected from the group consisting of a Cr compound, a Pb compound, a Mn compound, a Ni compound, a Co compound, a Zn compound, a Hg compound and a precious metal compound.

11. A cell according to claim 10 where second kind of binding domain comprises a motif selected from the group consisting of H/R-X_3-HRS and S/T-K/R-X_2-HRS.

12. A cell according to any of claims 1-11 which is selected from the group consisting of a prokaryote cell and an eukaryote cell.

13. A cell according to claim 12 which is a bacterial cell selected from the group consisting of a gram-positive bacterium and a gram-negative bacterium.

14. A cell according to claim 13 which is an *Enterobacateriaceae* species.

15. A cell according to claim 1 where the gene coding for the adhesin protein is located on a plasmid.

16. A method of removing a metal compound from an environment, comprising adding to said environment a cell according to any of claims 1-15 which is capable of binding the metal compound to the second kind of binding domain, and separating the cell from the environment.

17. A method according to claim 16 wherein the cell is immobilized by binding to a receptor for the first kind of binding domain.

18. A population of recombinant cells, the population comprising a multiplicity of clones of a cell as defined in claim 1 each of which clones expresses an adhesin comprising a different second kind of binding domain.

19. A population according to claim 18 that comprises at least 10^6 different clones.

20. A method of constructing a cell population as defined in claim 18, comprising the steps of constructing a random library of DNA sequences coding for a peptide, inserting the library into a gene coding for an adhesin protein, and transforming a host cell population with the library.

21. A method according to claim 20 wherein the adhesin is FimH.

22. A method according to claim 20 comprising a further step of enriching the cell population for cells specifically binding to a particular compound to which the adhesin protein from which the multifunctional adhesin protein is derived, substantially does not bind, the step comprising contacting the cell population with said compound whereby cells expressing a second kind of binding domain that is capable of binding to the compound form aggregates with said compound, separating the cell-compound aggregates and isolating cells capable of binding to the compound.

23. A method according to claim 22 wherein the compound is a metal compound.

24. A method according to claim 22 wherein the enrichment step is repeated two or more times.

25. A method according to claim 22 wherein the first kind of binding domain is blocked during the enrichment procedure.

26. An isolated fimbrial structure comprising a multifunctional adhesin protein that contains at least one first kind of binding domain and at least one second kind of binding domain, said first kind of binding domain is capable of binding to an organic receptor and said second kind of binding domain is capable of binding to a compound to which the naturally occurring adhesin protein substantially does not bind.

27. A fimbrial structure according to claim 26 having a second kind of binding domain that binds to a metal.

28. Use of a cell according to any of claims 1-15 or a fimbrial structure according to claim 26 for removing a compound from an environment, the method comprising adding to the environment said cell or said fimbrial structure, which is capable of binding the compound to the second kind of binding domain and separating aggregates of cell or fimbrial structure with the compound from the environment.

29. Use according to claim 28 wherein the cell or the fimbrial structure are immobilized by binding to a receptor for the first kind of binding domain.

30. Use according to claim 28 wherein the compound being removed is a metal compound.

31. Use of a cell according to any of claims 1-15 or a fimbrial structure according to claim 26 for removing a compound from an environment, the method comprising adding to the environment said cell or said fimbrial structure which is capable of binding the compound to the first kind of binding domain and separating aggregates of cell or fimbrial structure with the compound from the environment.

32. Use according to claim 31 wherein the cell or the fimbrial structure are immobilized by binding to a receptor for the second kind of binding domain.